

## The *Timbellus richeri* complex (Gastropoda: Muricidae) in the southwest Pacific

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**KEYWORDS.** Gastropoda, Muricidae, Southwest Pacific, Coral Sea, New Caledonia, Fiji, Tonga, Kermadec, *Timbellus* n. sp.

**ABSTRACT.** Two new species of *Timbellus* are described from the Coral Sea and the New Caledonia region with extension to Fiji, Tonga and the Kermadec Islands for one species. Both species are compared to *T. richeri* (Houart, 1987) and *T. vespertilio* (Kuroda, 1959). Nine species of the genus *Timbellus* are recorded from the Coral Sea and the New Caledonia region. Only one, *T. bilobatus* n. sp. is known from other localities in the Indo-West Pacific province.

### INTRODUCTION

Examination of new material from Fiji and Tonga (Houart & Héros, 2008) and re-examination of the whole material available from the Coral Sea and the New Caledonia zone has led to a clear separation of three taxa belonging to the *Timbellus richeri* complex, two of which are still unnamed and are described here. *Timbellus bilobatus* n. sp. and *T. sublimis* n. sp. have long been confused by the author with the related *T. richeri* (Houart, 1987). Each of the three species has in common a relatively similar size, a paucispiral protoconch of 1.5 rounded whorls, a narrow shoulder spine, webbed abapical spines and a long, narrow siphonal canal, but differs constantly in other morphological characters and lives in a well-defined geographical area.

Nine species of the genus *Timbellus*, including the two new species described here, are recorded from the Coral Sea and the New Caledonia region and are listed at the end of the paper (Table 1).

**Terminology used to describe the spiral cords and apertural denticles morphology (after Merle, 1999 and 2001)** (Figs 18, 24, 30).

**P:** primary cord; **s:** secondary cord; **ad:** adapical (or adapertural); **ab:** abapical (or abapertural); **P1:** shoulder cord; **P2-P6:** primary cords of the convex part of the teleoconch whorl; **s1-s6:** secondary cords of the convex part of the teleoconch whorl (example: s1 = secondary cord between P1 and P2; s2 = secondary cord between P2 and P3, etc.); **ADP:** adapertural primary cord on the siphonal canal; **MP:** median primary cord on the siphonal canal. Aperture: **ID:** Infrasutural denticle; **D1 to D5:** Abapical denticles

### Repositories

MNHN: Muséum national d'Histoire naturelle, Paris, France.

NZOI: National Institute of Water and Atmospheric Research, Wellington, New Zealand.

RH: collection Roland Houart.

SAM: South Australian Museum, Adelaide, South Australia.

### Other abbreviations

CP: Chalut à perche (Beam trawl).

DC: Drague Charcot (Charcot dredge).

dd: empty shells.

DW: Drague Warén (Warén dredge).

IRD: Institut de Recherche pour le Développement (Formerly ORSTOM).

lv: live-taken specimens.

### SYSTEMATICS

Family **MURICIDAE** Rafinesque, 1815

Subfamily **MURICINAE** Rafinesque, 1815

Genus *Timbellus* de Gregorio, 1885

Type species *Murex latifolius* Bellardi, 1872 by subsequent designation (Vokes, 1964), Middle Miocene, Italy.

**Remarks.** Many species have been traditionally classified in *Pterynotus* (Vokes, 1964, 1971, Fair, 1976, Radwin & D'Attilio, 1976, Houart, 1994), including *P. richeri* Houart, 1987. However, according to recent molecular research (Barco et al., 2010), *Pterynotus* appears to be polyphyletic.

A first group includes all the species with a sculptural pattern similar to the type species of *Pterynotus*, *P. alatus* (Röding, 1798) (= *Murex pinnatus* Swainson, 1822).

A second group, supported by the position of *P. fulgens* Houart, 1988 in the DNA analysis where it is even classified outside of the Muricinae (Barco et al., 2010) includes species generally classified in *Pterynotus* s.s. but with a less scabrous shell morphology and with three major axial varices "appearing early during the ontogeny" (Merle et al., 2011)

The classification here used follows Barco et al. (2010) who mentioned this polyphyletic group and Merle et al. (2011) who reinstated the genus *Timbellus* for these species with a less scabrous shell morphology.

***Timbellus richeri* (Houart, 1987)**

Figs 1-6, 18-23, 44

*Pterynotus richeri* Houart, 1987: 758, figs 1-1A; 1994: 85, pl. 2, fig. 8.

*Timbellus richeri* – Merle et al., 2011: 460, pl. 108, figs 11-14 (only).

**Type material.** Holotype (lv) MNHN 0920 and 2 paratypes (lv) MNHN 0919; 1 paratype (dd) coll. RH.

**Type locality.** Coral Sea, Nova Bank, 22°26'40 S, 159°19'80 E, 320 m, 28 Jul 1984.

**Material examined.** **Coral Sea, Nova Bank,** CHALCAL 1, 1984: Stn DC66, 22°26'40 S, 159°19'80 E, 320 m, (3 lv), holotype and 2 paratypes MNHN; stn DC63, 22°11' S, 159°15' E, 305 m, (1 dd), paratype RH – MUSORSTOM 5, stn CP311, 22°14' S, 159°24' E, 320 m, 1 dd; stn CP316, 22°25' S, 159°24' E, 330 m, 2 dd; stn CP318, 22°27' S, 159°21' E, 330 m, 1 lv, 1 dd; stn CP320, 22°25' S, 159°13' E, 315 m, 1 lv; **Nova Bank south,** EBISCO: Stn DW2521, 22°45' S, 159°20' E, 310-313 m, 1 lv; **Nova Bank north,** stn

CP2540, 22°16' S, 159°26' E, 323-331 m, 4 lv & dd; stn CP2542, 22°15' S, 159°25' E, 335-338 m, (co-occurring with *T. bilobatus* n. sp.) 1 lv, 1 dd

**Distribution** (Fig. 44). Living in a very small area, Coral Sea, Nova Bank, west of New Caledonia, from 22°16'-22°26' S and 159°20'-159°26' E. Living at 305-335 m.

**Description.** Shell medium sized for the genus, up to 31 mm in height at maturity. Height/width ratio 1.03-1.16. Slender, triangular, narrow, smooth, lightly built. Subsutural ramp broad, strongly sloping, weakly concave.

White with a light brown, narrow band on each side of P1, more obvious on abapertural side of P1 spine; occasionally completely white. Aperture white.

Spire moderately high with 1.5 protoconch whorls. Teleoconch up to 6 weakly convex, narrow, weakly shouldered whorls. Suture weakly adpressed or impressed. Protoconch small. Whorls rounded, smooth, height 600-700 µm, width 700 µm. Terminal lip delicate, thin, weakly curved.

Axial sculpture of teleoconch whorls consisting of 4 low, thin lamellae on first whorl; other whorls with 3 narrow varices, each with long, broad, webbed shoulder spine and webbed abapical spine. Other axial sculpture of a more or less obvious intervarical node; shell occasionally smooth, except numerous, low growth striae. Spiral sculpture of a high, rounded, narrow shoulder cord P1, P2 and P3 very shallow, occasionally with s2. P4 slightly stronger than P2 and P3, giving rise to a broadly webbed, short spine. P5 narrow, shallow, rarely ending as short, very weakly webbed spine. P6 narrow, low, ending as very short spinelet on the siphonal canal, followed by narrow ADP, ending also as short spinelet on siphonal canal (Fig. 18).

## Figures 1-16

**1-6.** *Timbellus richeri* (Houart, 1987)

**1-2.** Coral sea, Nova Bank, 22°26'40 S, 159°19'80 E, 320 m, holotype MNHN 0920, 28 mm; **3.** Coral Sea, Nova Bank south, Ebisco, stn CP 2542, 22°15' S, 159°25' E, 335-338 m, MNHN, 22.5 mm; **4.** Coral Sea, Nova Bank south, Ebisco, stn CP 2540, 22°16' S, 159°26' E, 323-331 m, MNHN, 22.4 mm; **5-6.** Coral Sea, Nova Bank south, Ebisco, stn CP 2540, 22°16' S, 159°26' E, 323-331 m, MNHN, 18.5 mm.

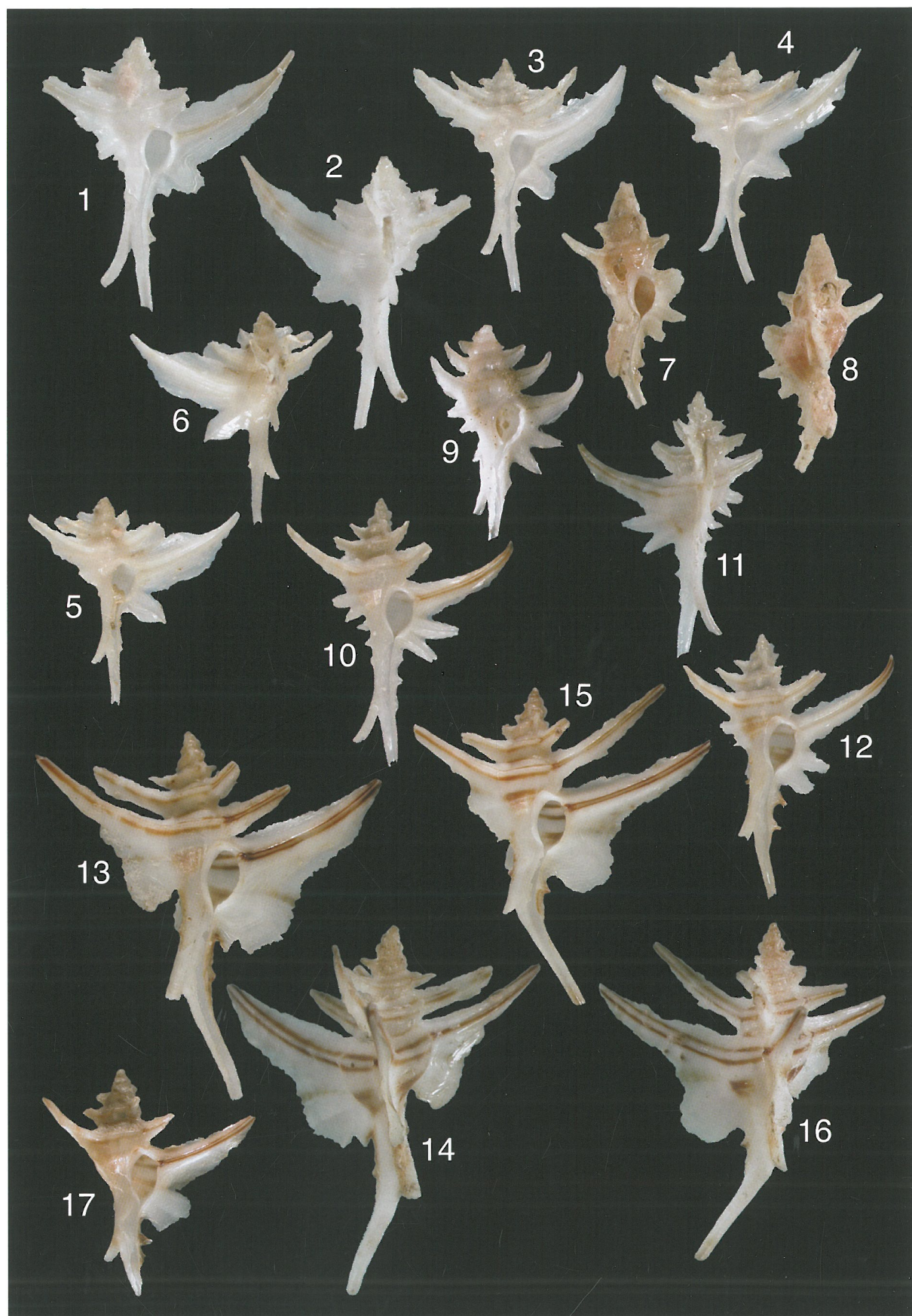
**7-12.** *Timbellus bilobatus* n. sp.

**7-8.** North of New Caledonia, Concalis, stn DW2973, 18°14' S, 163°06' E, 288 m, holotype MNHN 25163; **9.** Coral Sea, Nova Bank south, Ebisco, stn DW 2610, 19°34' S, 158°41' E, 486-494 m, MNHN, 18.5 mm; **10-11.** Coral Sea, Nova Bank south, Ebisco, stn CP 2572, 20°23' S, 158°45' E, 324-330 m, paratype MNHN 23268, 29.6 mm; **12.** Coral Sea, Nova Bank south, Ebisco, stn DW 2547, 21°06' S, 158°36' E, 356-438 m, paratype MNHN 23269, 28.1 mm;

**13-17.** *Timbellus sublimis* n. sp.

**13-14.** Coral Sea, Nova Bank south, Ebisco, stn 2528, 22°49' S, 159°23' E, 320-345 m, holotype MNHN 23270, 38.2 mm; **15-16.** Coral Sea, Nova Bank south, Ebisco, stn 2501, 24°50' S, 159°51' E, 320-325 m, paratype MNHN 23271, 34.0 mm; **17.** Coral Sea, Nova Bank south, Ebisco, stn DW 2534, 22°17' S, 159°28' E, 390-430 m, MNHN, 17.10 mm.





Aperture small, ovate. Columellar lip narrow, smooth. Rim partially erect, adherent at adapical extremity. Anal notch broad, shallow. Outer lip weakly erect, smooth, with strong notch into channel of shoulder spine. Smooth within. Siphonal canal long, narrow, very weakly dorsally recurved and weakly abaxially recurved, with two very short, narrow spines adapically (P6 and ADP). Previous canal obvious and long. Operculum and radula not examined.

**Comments.** *Timbellus richeri* was described from 4 specimens and since its discovery this very beautiful long-spined species has been collected only in a very small area, west of New Caledonia. It is apparently very rare and extremely fragile. It was confused by the author with *Timbellus sublimis* n. sp. and with *T. bilobatus* n. sp. See under *T. sublimis* n. sp. for more comments.

*Timbellus bilobatus* n. sp.  
Figs 7-12, 24-29, 45

*Pterynotus* sp. cf. *richeri* – Houart & Héros, 2008: 448, fig. 2E.

*Timbellus vespertilio* – Merle et al., 2011: 460, pl. 108, figs 9-10 (not *Murex vespertilio* Kuroda, 1955).

*Timbellus* cf. *richeri* – Merle et al., 2011: 460, pl. 108, figs 16-19.

**Type material.** Holotype (lv), MNHN 25163 (MNHN Barcode collection number: IM-2009-4870; Barcode of Life Data system process ID: MPOM040-10; GenBank accession number for the COI sequence: JX466892).

Paratypes: Coral Sea, west Bellona, EBISCO, stn DW2547, 21°06' S, 158°36' E, 356-438 m, 2 lv (1 MNHN 23269, 1 RH); north Bellona, stn CP2572, 20°23' S, 158°45' E, 324-330 m, 1 lv (MNHN 23268).

**Type locality.** North of New Caledonia, CONCALIS, Stn DW2973, 18°14' S, 163°06' E, 288 m, 03 May 2008.

**Material examined.** **Coral Sea, Chesterfield,** MUSORSTOM 5: Stn DW338, 19°52' S, 158°40' E, 540-580 m, 1 lv; stn DW340, 19°49' S, 158°41' E, 340 m, 2 dd; stn DC375, 19°52' S, 158°30' E, 300 m, 1 lv; stn DC377, 19°49' S, 158°29' E, 260-270 m, 1 dd; stn DC378, 19°54' S, 158°38' E, 355 m, 4 dd.

**Coral Sea, Nova Bank north,** EBISCO: Stn CP2542, 22°15' S, 159°25' E, 335-338 m, (co-occurring with *T. richeri*) 1 lv; **west Bellona,** stn DW2547, 21°06' S, 158°36' E, 356-438 m, 2 lv (paratype MNHN 23269 and paratype RH); stn DW2555, 21°04' S, 158°35' E, 500-614 m, 1 dd; **north Bellona,** stn CP2572, 20°23' S, 158°45' E, 324-330 m, 1 lv (paratype MNHN 23268); stn DW2574, 20°20' S, 158°45' E, 358-374 m, 1 dd; **Chesterfield,** stn DW2586, 19°35' S, 158°43' E, 542 m, 1 lv, MNHN IM-2009-5140; stn CP2592, 19°37' S, 158°42' E, 519-522 m, 1 dd; 1 dd; stn DW2610, 19°42' S, 158°30' E, 273-281 m, 1 dd; stn DW2613, 19°37' S, 158°42' E, 519-522 m, 1 dd.

**North of New Caledonia,** CONCALIS: Stn DW2945, 19°00' S, 163°26' E, 310 m, 1 lv, MNHN IM-2009-4871; stn DW2973, 18°14' S, 163°06' E, 288 m, 1 lv (holotype MNHN 25163 ex IM-2009-4870, BOLD [MPOM040-10]); stn DW2979, 18°16' S, 162°54' E, 350, 1 dd.

**South of New Caledonia,** CHALCAL 2: Stn DW69, 24°44' S, 168°08' E, 260 m, 1 dd; SMIB 8: Stn DW148, 24°56' S, 168°21' E, 510 m, 1 dd; stn DW181, 23°18' S, 168°05' E, 311-330 m, 1 dd; stn DW182, 23°19' S, 168°05' E, 314-330 m, 1 dd; stn DW182-DW184, 23°18' S – 23°19' S, 168°05' E, 305-367 m, 1 lv.

**Figures 18-35** (scale bars: 500 µm)

**18-23.** *Timbellus richeri* (Houart, 1987)

**18.** Coral Sea, Nova Bank south, Ebisco, stn CP 2540, 22°16' S, 159°26' E, 323-331 m, MNHN, 18.5 mm; **19-20.** Protoconch; **21.** Coral Sea, Nova Bank south, Ebisco, stn CP 2540, 22°16' S, 159°26' E, 323-331 m, MNHN, 22.4 mm; **22-23.** Coral Sea, Nova Bank south, Ebisco, stn CP 2540, 22°16' S, 159°26' E, 323-331 m, MNHN, 14.2 mm.

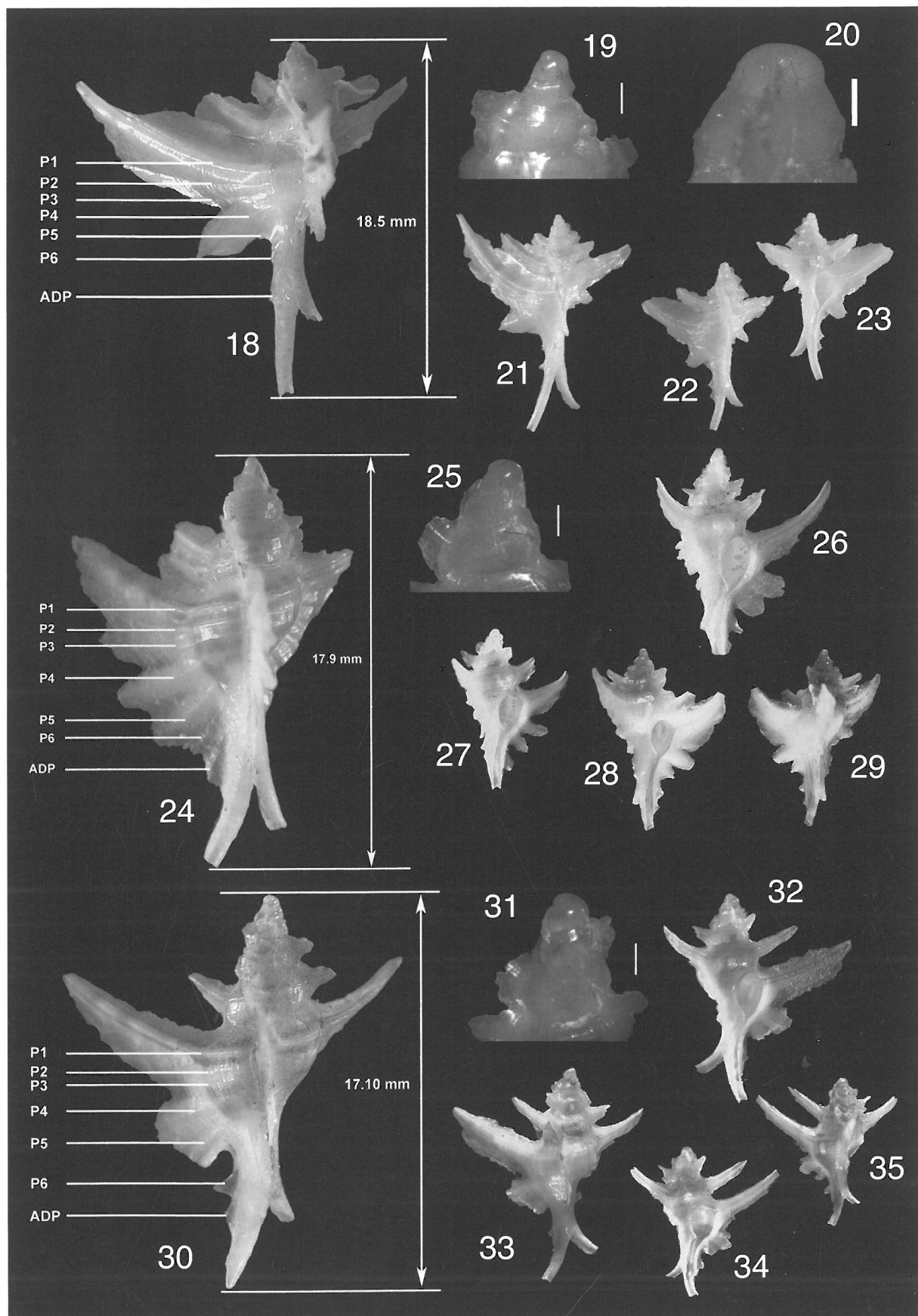
**24-29.** *Timbellus bilobatus* n. sp.

**24.** New Caledonia, Norfolk Ridge, SMIB 8, stn DW 148, 24°56' S, 168°21' E, 510 m, MNHN, 17.9 mm; **25.** Protoconch; **26.** Coral Sea, Nova Bank south, Ebisco, stn DW 2555, 21°04' S, 158°35' E, 500-614 m, MNHN, 15.3 mm; **27.** Coral Sea, Nova Bank south, Ebisco, stn DW 2610, 19°34' S, 158°41' E, 486-494 m, MNHN, 11.7 mm; **28-29.** Coral Sea, Nova Bank south, Ebisco, stn CP 2542, 22°15' S, 159°25' E, 335-338 m, MNHN, 14.1 mm.

**30-35.** *Timbellus sublimis* n. sp.

**30.** Coral Sea, Nova Bank south, Ebisco, stn DW 2534, 22°17' S, 159°28' E, 390-430 m, MNHN, 17.1 mm; **31.** Protoconch; **32-33.** Coral Sea, Nova Bank south, Ebisco, stn DW 2527, 22°45' S, 159°22' E, 330-340 m, MNHN, 12.6 mm; **34-35.** Coral Sea, Nova Bank south, Ebisco, stn DW 2535, 22°17' S, 159°28' E, 490 m, MNHN, 8.6 mm.





**Norfolk Ridge**, BATHUS 3: Stn DW829, 23°21' S, 168°02' E, 386-390 m, 2 dd; stn DW830, 23°20' S, 168°01' E, 361-365 m, 2 dd – **NORFOLK 1**: Stn DW1679, 24°43' S, 168°10' E, 298-324 m, 1 dd; stn DW1732, 23°20' S, 168°16' E, 347-1063 m, 1 dd.

**Loyalty Ridge**, MUSORSTOM 6: Stn DW399, 20°42' S, 167°00' E, 282 m, 5 dd; stn DW406, 20°41' S, 167°07' E, 373 m, 1 lv; stn DW407, 20°41' S, 167°07' E, 360 m, 1 dd; stn DW416, 20°42' S, 167°00' E, 343 m, 1 dd; stn DW460, 21°02' S, 167°31' E, 420 m, 3 dd; stn DW461, 21°06' S, 167°26' E, 240 m, 1 lv; stn DW472, 21°09' S, 167°55' E, 300 m, 3 dd; stn DW477, 21°08' S, 167°55' E, 550 m, 1 dd; stn DW478, 21°09' S, 167°54' E, 400 m, 1 dd; stn DW479, 21°09' S, 167°55' E, 310 m, 1 dd; SMIB 5: Stn DW91, 22°18' S, 168°41' E, 340 m, 1 lv; stn DW102, 23°20' S, 168°05' E, 305 m, 1 lv.

**Volcans Hunter & Matthew**, VOLSMAR: Stn DW9, 22°23' S, 171°41' E, 275-300 m, 1 dd; stn DW38, 22°22' S, 168°44' E, 380-420 m, 1 dd.

**Fiji**, BORDAU 1: Stn DW1399, 16°24'S, 179°55'W, 400 m, 1 dd; stn DW1469, 19°40'S, 178°10'W, 314-377 m, 7 lv & dd; stn CP1470, 19°40'S, 178°10'W, 316-323 m, 5 dd; stn DW1471, 19°40'S, 178°10'W, 280-296 m, 2 dd; stn CP1474, 19°39'S, 178°10'W, 316-340 m, 1 lv; stn CP1475, 19°41'S, 178°11'W, 321-424 m, 2 dd; stn DW1485, 19°03'S, 178°30'W, 700-707 m, 1 lv; stn DW 1497, 18°44'S, 178°25'W, 335-350 m, 6 lv, 1 dd.

**Tonga**, BORDAU 2: Stn DW1518, 21°21'S, 175°07'W, 336-347 m, 1 dd; stn DW1532, 21°44'S, 175°20'W, 322 m, 3 dd; stn CP1533, 21°44'S, 175°20'W, 322-329 m, 1 dd; stn DW1534, 21°43'S, 175°19'W, 302-327 m, 8 dd; stn DW1535, 21°43'S, 175°18'W, 268 m, 5 dd; stn DW1536, 21°45'S, 175°21'W, 320-323 m, 9 lv & dd; stn DW 1537, 21°41'S, 175°19'W, 391-421 m, 6 dd; stn DW1548, 20°38'S, 175°03'W, 476-478 m, 2 dd; stn CP1560, 19°52'S, 174°39'W, 365-372 m, 4 dd, 1 lv; stn CP1561, 19°52'S, 174°40'W, 383-393 m, 1 lv; stn CP1562, 19°52'S, 174°42'W, 417-424 m, 1 lv, 1 dd; stn CH1563, 19°52'S, 174°39'W, 362-388 m, 1 dd; stn CP1572, 19°42'S, 174°31'W, 391-402 m, 2 lv; stn CP1591, 19°10'S, 174°15'W, 351-360 m, 1 dd; stn DW1607, 22°15'S, 175°23'W, 356-367 m, 8 dd; stn DW1608, 22°12'S, 175°27'W, 401-413 m, 1 dd; stn DW1614, 23°02' S, 175°51'W, 429-549 m, 3 dd; stn DW1615, 23°03'S, 175°53'W, 482-504 m, 1 dd; stn DW1634, 21°45'S, 175°20'W, 321-322 m, 7 dd; stn DW1635, 21°44'S, 175°20'W, 320-323 m, 5 dd; stn DW1636, 21°44'S, 175°20'W, 321-331 m, 3 dd.

**Kermadec Islands**, off Raoul Island, 29°14.8' S, 177°49.6' W, 490-590 m, 1 dd.

**Distribution** (Fig. 45). **Coral Sea and New Caledonia**. From 18°14'- 24°56' S to 158°29'- 171°41' E.

**Kermadec Islands**, off Raoul Island, 29°14.8' S, 177°49.6' W, 490-590 m (dd), NZOI K804.

**Fiji**. From 16°24'-19°41' S to 178°10'-179°55' W.

**Tonga**. From 19°10'-23°03' S to 174°15'-175°53' W.

Living at 240-417 m.

**Description**. Shell up to 29.6 mm in height at maturity (paratype MNHN 23268). Height/width ratio 1.26 (paratype MNHN 23268). Slender, triangular, narrow, lightly built. Subsutural ramp strongly sloping, weakly concave.

Ivory white or creamy white with light brown band on each side of P1 and light brown colour on each side and on P4 and P5, occasionally on P6. Aperture white. Spire high with 1.5 protoconch whorls and teleoconch of up to 6 convex, narrow, weakly shouldered whorls. Suture weakly adpressed. Protoconch small, height 700-800  $\mu$ m, width 700  $\mu$ m. Whorls rounded, smooth, glossy. Terminal lip delicate, thin, weakly curved.

Axial sculpture of first teleoconch whorl consisting of 5 narrow, low lamellae. Other whorls with 3 narrow, thin varices, each with long, broad, webbed primary spines. Shoulder spine longest. Other occasional axial sculpture of a single, small node on second, third, fourth and occasionally on fifth whorl, between P1 and P2, and of numerous, low growth striae. Spiral sculpture of low, narrow, smooth primary and occasional secondary cords. First to penultimate whorl with visible P1 and P2, or P1-P3. P2 and P3 mostly very low and narrow, almost obsolete. Last whorl with P1-P6. Occasionally with s3. P1 conspicuous, ending as long, webbed shoulder spine with a deep, open channel on its ventral side. P2 and P3 low in most adult forms, P4 and P5 ending as short, broad, webbed spines, clearly separated from each other, with a shallow, occasionally indistinct open channel on their ventral side. P6, adapical spine on siphonal canal, short or nearly obsolete, followed by ADP and occasionally by MP (Fig. 24).

Aperture ovate. Columellar lip narrow, smooth. Rim partially erect, adherent at adapical extremity. Anal notch broad, shallow. Outer lip weakly erect, smooth, with strong notch into channel of shoulder spine and with weak, narrow denticles within, probably D3 split, D4 and D5. Other denticles indistinguishable. Siphonal canal long, narrow, weakly dorsally recurved and abaxially bent, narrowly open, with one or two short, open spinelets adapically (P6 and ADP), rarely with very weak MP.

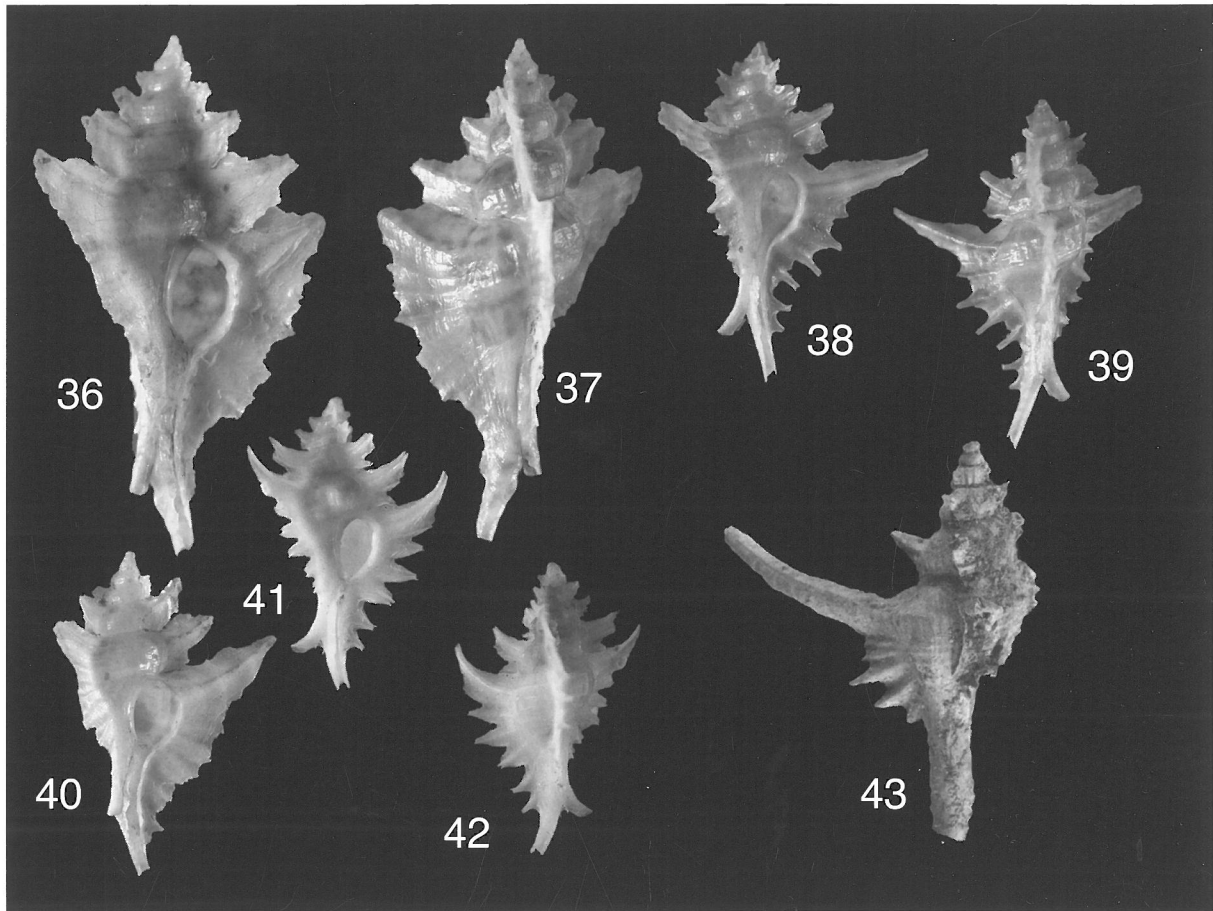
Operculum and radula not examined.

**Etymology**. Named after the bi-lobed expansion of P4 and P5.

**Discussion**. The holotype is not the best specimen but it has been chosen as name-bearing type because it is associated with a molecular sequence (MNHN

Barcode collection number: IM-2009-4870; Barcode of Life Data system process ID: MPOM040-10;

GenBank accession number for the COI sequence: JX466892). See also under *T. sublimis* n. sp.



Figures 36-43

**36-42.** *Timbellus vespertilio* (Kuroda, 1959).

**36-37.** Japan, Honshu, RH, 43.1 mm; **38-39.** Philippines, Davao, RH, 26.2 mm; **40.** Japan, Honshu, RH, 22.0 mm; **41-42.** Philippines, Davao, RH, 18.3 mm.

**43.** *Timbellus tenuicornis* (Tate, 1888). Adelaide-Bore, Eocene, holotype SAM T431, 19 mm.

*Timbellus sublimis* n. sp.  
Figs 13-17, 30-35, 46

*Timbellus richeri* – Merle et al., 2011: 460, pl. 108, fig. 15 (not *Pterynotus richeri* Houart, 1987).

**Type material.** Holotype (lv), MNHN 23270. Paratypes: 14 MNHN 23271, 1 RH.

**Type locality.** Coral Sea, Nova Bank south, EBISCO, stn DW2528, 22°49' S, 159°23' E, 320-345 m, 09 Oct 2005.

**Material examined.** Coral Sea, Kelso Bank, MUSORSTOM 5: Stn CP279, 24°09' S, 159°38' E,

260-270 m, 1 lv; stn DW280, 24°10' S, 159°36' E, 270 m, 1 dd; stn DW283, 24°11' S, 159°32' E, 280-300 m, 2 dd; **Argo Bank**, stn DW298, 22°44' S, 159°22' E, 320 m, 1 dd; stn DW299, 22°48' S, 159°24' E, 360-390 m, 5 dd; stn DW300, 22°48' S, 159°24' E, 450 m, 6 dd; **Nova Bank**, stn DW301, 22°07' S, 159°25' E, 487-610 m, 2 dd; stn DW303, 22°12' S, 159°23' E, 332 m, 2 dd; stn DW304, 22°10' S, 159°26' E, 385-420 m, 1 dd.

**Coral Sea, Capel Bank, EBISCO:** Stn CP2494, 24°45' S, 159°42' E, 348-354 m, 1 dd; stn DW2496, 24°46' S, 159°43' E, 400-418 m, 2 dd; stn DW2497, 24°46' S, 159°43' E, 485-500 m, 2 dd; stn CP2499, 24°53' S, 159°52' E, 286-529 m, 1 lv; stn CP2500,



24°52'S, 159°21'E, 310-320 m, 1 lv; stn DW2501, 24°50'S, 159°51'E, 320-325 m, 3 lv; stn DW2504, 24°48'S, 159°46'E, 390-600 m, 1 dd; **Kelso Bank**, stn DW2514, 24°06'S, 159°41'E, 295-310 m, 2 dd; stn DW2519, 24°08'S, 159°42'E, 310-463 m, 1 dd; stn DW2520, 24°06'S, 159°41'E, 350-400 m, 6 dd; **Nova Bank south**, stn DW2522, 22°46'S, 159°21'E, 310-318 m, 1 dd; stn DW2523, 22°45'S, 159°22'E, 325-400 m, 4 dd; stn DW2525, 22°48'S, 159°23'E, 408-410 m, 4 dd; stn DW2526, 22°46'S, 159°23'E, 330-340 m, 9 dd; stn DW2527, 22°45'S, 159°22'E, 330-340 m, 1 lv; stn DW2528, 22°49'S, 159°23'E, 320-345 m, 15 lv & dd (holotype MNHN 23270, 14 paratypes MNHN 23271); stn CP2529, 22°47'S, 159°23'E, 330-340 m, 2 lv (1 paratype RH); stn DW2530, 22°48'S, 159°23'E, 338-343 m, 5 dd; stn CP2531, 22°47'S, 159°23'E, 330-340 m, 2 dd, 1 lv; **Nova Bank north**, stn DW2534, 22°17'S, 159°28'E, 390-430 m, 1 lv, 2 dd; stn DW2535, 22°17'S, 159°28'E, 490 m, 1 lv, 2 dd; stn DW2536, 22°19'S, 159°29'E, 650-713 m, 2 dd; **north Bellona**, stn DW2578, 20°21'S, 158°40'E, 440-505 m, 1 dd.

**Distribution** (Fig. 46). Coral Sea, west of New Caledonia, approximately from 22°07'-24°53' S to 159°21'-159°52' E. A single, dead specimen was dredged from 20°21'S, 158°40'E. Living at 320-390 m.

**Description.** Shell up to 38.2 mm in length at maturity (holotype). Length/width ratio 1.03-1.12. Slender, triangular, narrow, lightly built. Subsutural ramp strongly sloping, weakly concave.

Creamy white with obvious dark brown band on each side of P1 and dark brown coloured on P4, between P4 and P5, on P6, ADP and MP, and on the narrow flange connecting the siphonal canal spinelets. Aperture white with brownish lines by transparency.

Spire high or very high, acute, with 1.5 protoconch whorls and teleoconch up to 6 convex, narrow, weakly shouldered whorls. Suture weakly adpressed or impressed. Protoconch small, height 700 µm, width 700 µm, whorls rounded, smooth. Terminal lip delicate, thin, weakly curved.

Axial sculpture of teleoconch whorl consisting of 4 low, thin lamellae on first whorl. Other whorls with 3 narrow varices, each with long, broad, webbed shoulder spine and broadly webbed adapical spines. Other axial sculpture of a single intervarical node between P1 and P2, decreasing in strength abapically; obsolete on penultimate and last whorls. Presence of numerous, low growth striae. Spiral sculpture of high, strong shoulder cord P1; P2 and P3 very low, narrow; P4 and P5 low, narrow, weakly more conspicuous than P2 and P3; P6 low. P1 giving rise to a long, broadly webbed, shoulder spine, connected by thin flange to P2-P5. P4 and P5 forming a thin, broadly expanded lobe, more expanded than P2 and P3. Occasional presence of s4. P6 giving rise to a short

spinelet on siphonal canal, followed by very short or nearly obsolete ADP and MP (Fig. 30).

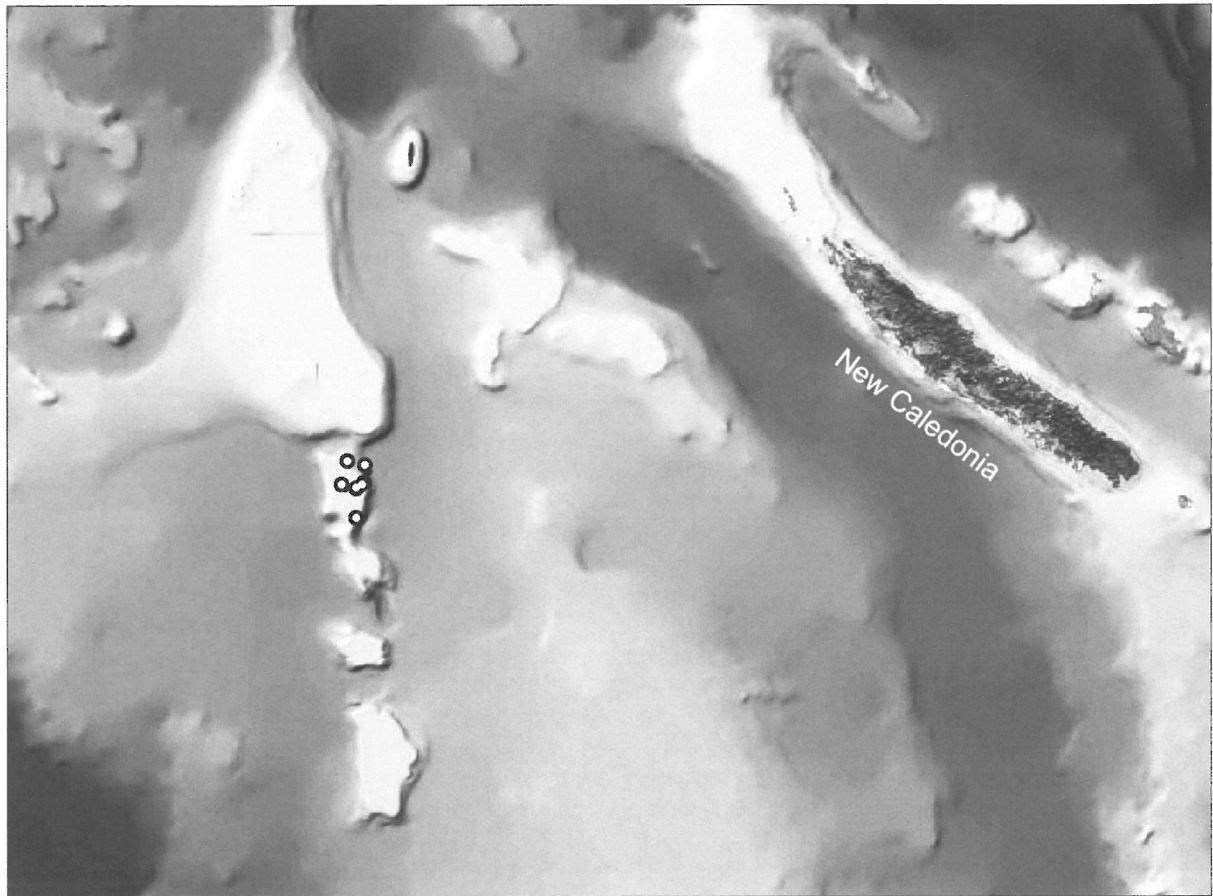
Aperture ovate, columellar lip narrow, smooth. Rim partially erect, adherent at adapical extremity. Anal notch broad, shallow. Outer lip weakly erect, smooth, with strong notch into channel of shoulder spine and with weak, narrow denticles within, probably D2, D3, D4 split, and D5. Siphonal canal long, narrow, weakly dorsally recurved and strongly bent abaxially, narrowly open, with 2 or 3 very short, open spinelets (P6, ADP and MP). Previous canal obvious and long. Operculum and radula not examined.

**Etymology.** *Sublimis* (L): The term 'sublime' (from the Latin *sublimis*) is often used to suggest a quality of greatness or magnitude. It is here used to underscore the beauty of the species.

**Discussion.** All the examined specimens in the *T. richeri* group have a similar, small protoconch of 1.5, smooth, glossy, rounded whorls, with low, weakly convex, thin and fragile terminal lip (Figs 19-20, 25, 31). The spiral sculpture of the last teleoconch whorl consists of P1-P6, occasionally with s2, s3 or s4. All these cords are low and shallow, occasionally indistinguishable, except P1 which is broad and conspicuous, extending as a long shoulder spine, forming a narrow, relatively deep, open channel on its ventral side. There are 2 more or less visible, strongly abapically bent cords on the siphonal canal, P6 and ADP, which give rise to short, small spinelets.

The three closely related species in this group live in a well-defined geographical area (Figs 44-46). They are sympatric on the Nova Bank, but clearly live in different environmental conditions. Only two species co-occur in one locality. The typical form, *T. richeri*, is that of a narrow shell with a very broad, fragile, long shoulder spine and a short, broad varical flange formed by the extension of P4, or rarely of P4 and P5. The shoulder spine of the preceding whorl is squeezed up against, or occasionally fused with the shoulder spine of the succeeding whorl. The siphonal canal is narrow, almost straight and long with two small, narrow and short spines. The spire is relatively low compared to the two other species.

*Timbellus sublimis* n. sp. also has a very long shoulder spine, but with a more conspicuous P1, with a more apparent reddish brown line on both sides of the cord, and on the ventral part of the spines and less squeezed up to the shoulder spine of the succeeding whorl. The P1 spine is comparatively narrower, and the open channel on the ventral side is deeper than in *T. richeri*. The colour lines are also present in *T. richeri* and *T. bilobatus* n. sp. but not consistently, and less obviously. In *T. sublimis*, P1-P5 are connected to each other with a thin, fragile varical flange. The flange is more expanded on P4, s4 and P5 giving rise to a kind of broad, thin and very fragile lobe. In comparison, the expanded lobe in *T. richeri* even when originating



**Figure 44.** Distribution of *Timbellus richeri* (Houart, 1987)



**Figure 45.** Distribution of *Timbellus bilobatus* n.sp. (the Kermadec Islands are not indicated)



**Figure 46.** Distribution of *Timbellus sublimis* n.sp.

from P4 and P5, is narrower, due to absence of s4, and because it has the primary cords more close to each other than in *T. sublimis* n.sp.

The suture of the teleoconch whorls in both *T. sublimis* and *T. richeri* is less adpressed than in *T. bilobatus*, or even impressed.

The spire whorls are higher, 31.9 – 41.3 % of total shell height in *T. sublimis* and *T. bilobatus* vs 27 – 31% in *T. richeri*.

The mean percentage of the spire height, compared to the total shell height is 28.8 % in *T. richeri*, 33.4 % in *T. bilobatus* n.sp. and 34.4 % in *T. sublimis* n.sp.

The siphonal canal in *T. sublimis* n.sp. is strongly bent abaxially compared to the almost straight canal in *T. richeri* and *T. bilobatus* n.sp.

*Timbellus bilobatus* n.sp. resembles the two previous species but the P4 and P5 spiral cords are more obvious and give rise to short, channeled spines, not connected to each other like in *T. sublimis*, but rather

forming a "bilobed extension". Juvenile specimens (Figs 26-29) are also distinguished from the juvenile forms of the other two species (Figs 21-23 and 32-35) in having this bilobed extension but also in having occasionally secondary cords and more conspicuous P4 and P5.

The juveniles of *T. bilobatus* are somewhat similar to adults of *T. vespertilio* (Kuroda, 1959) known from the Philippines, the South China Sea, Taiwan and southern Japan. However, *T. vespertilio* differs constantly in having a relatively higher spire, a shorter siphonal canal and in having obvious varical spines connected or not with a varical flange (Figs 36-42).

A possible common ancestor of these three species could be *Timbellus tenuicornis* (Tate, 1888) from Adelaide (Kent Town) Bore (Eocene), Australia (Fig. 43). See also Ludbrook (1973) for the stratigraphic position of the Adelaide Bore molluscs.



Species	IRD-MNHN expeditions
<i>Timbellus bilobatus</i> n. sp.	Described in this paper
<i>Timbellus crauroptera</i> (Houart, 1991)	BIOCAL - MUSORSTOM 5 - SMIB 8 - BERYX 11
<i>Timbellus fulgens</i> (Houart, 1988)	MUSORSTOM 4, 5, 6 - SMIB 2, 8 - CHALCAL 2 - BIOCAL - BATHUS 2, 3, 4 - BERYX 11 - NORFOLK 2 - CONCALIS
<i>Timbellus levii</i> (Houart, 1988)	BIOCAL - MUSORSTOM 6 - VOLSMAR - EBISCO
<i>Timbellus marshalli</i> (Houart, 1989)	NORFOLK 2
<i>Timbellus richeri</i> (Houart, 1987)	CHALCAL 1, 2 - MUSORSTOM 5, 6 - SMIB 5, 8 - VOLSMAR - BATHUS 3 - NORFOLK 1 - NORFOLK 2 - EBISCO
<i>Timbellus rubidus</i> (Houart, 2001)	BATHUS 3 - LITHIST - NORFOLK 1
<i>Timbellus sublimis</i> n. sp.	Described in this paper
<i>Timbellus stenostoma</i> (Houart, 1991)	SMIB 5 - SMIB 8 - NORFOLK 1

**Table 1.** List of *Timbellus* species from the Coral Sea and the New Caledonia region

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